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| EXAMINER | |
|---|---|
| TABONE JR, JOHN J | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2133 | |

DATE MAILED: 02/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

MV

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/076,975 | WEISSINGER, STEVE H. | |
| | Examiner | Art Unit | |
| | John J. Tabone, Jr. | 2133 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *29 October 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) *27-34 and 41-45* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *Claims 1-26 and 35-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 February 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *09302002, 10062003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

1. Claims 1-26 and 35-40 have been examined. Claims 27-34 and 41-45 are non-elected per Applicant's response to Office Action 10/016/2004 and therefore have been withdrawn from consideration.

2. In order to expedite the prosecution for the subject application, the non-elected claims should be canceled in response to this office action.

### *Claim Objections*

3. Claim 7 is objected to because of the following informalities: "the message invalidated" should be "the message is invalidated". Appropriate correction is required.

4. Claim 14 is objected to because of the following informalities: "the segments constants obtain upon receipt of the message" should be reworded to read "the segment-constant is obtained upon receipt of the message". Appropriate correction is required.

5. Claims 15 and 25 are objected to because these claims do not further limit the independent claims in which they are dependent on, claims 11 and 23 respectively. Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 14 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 14:

This claim recites the limitation "the segments constants" in line 1. There is insufficient antecedent basis for this limitation in the claim. This should read "the segment-constants".

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-6, 8, 10, 11-15, 17-25, 35-37, 39 and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Christensen et al. US-5951707), hereinafter Christensen.

Claims 1, 11, 17, 23, 35 and 39:

Christensen teaches a communication system that includes a Transmission Network 10 interconnected by a plurality of ATM Links 14 to respective Data Terminal Equipment 12. (Col. 2, ll. 57-67, col. 3, ll. 1-6).

**"separating the message into a plurality of segments;"**

Christensen teaches system partitions the ATM packet into ATM cells which are forwarded to the ATM Adapter 22 for further processing. (Col. 3, ll. 25-32).

**"multiplying a remainder for each segment by a segment-constant based on a generator polynomial to obtain a plurality of segment-remainders;"**

Christensen teaches in order to calculate the CRC for a packet, the partial CRC from the hardware is multiplied by the corresponding fixed remainder in the table and a running sum of all the products of the partial CRCs and fixed remainders are taken.

**"accumulating the segment-remainders to obtain an accumulated-remainder;"**

Christensen teaches each partial CRC is multiplied by the appropriate $R_i$ and adding the result to the running sum (accumulated-remainder).

**"moduloing the accumulated-remainder by the generator polynomial to obtain the cyclic redundancy code for the message."**

Christensen teaches the remaining sum is then divided by two's complement to find the CRC for the packet. Christensen also teaches a two's complement division (moduloing) of this result yields the packet CRC. (Col. 4, ll. 5-32).

Claims 2, 12 and 36:

**"moduloing the segments by the generator polynomial to obtain the remainder for each segment"**

Christensen teaches the processor calculates the packet CRC for a packet from the partial CRCs associated with ATM cells of the packet, where each partial CRC

associated with an ATM cell of a packet is multiplied by an appropriate $R_i$, where $R_i$ represents a fixed remainder. (Col. 2, ll. 9-13).

Claims 3 and 19:

**"separating the message into three or more segments"**

Christensen teaches with respect to the Partial CRC Table ($T_B$), B represents the packet length and $B_i$ represents cell blocks in the packet. With this notation, 1 represents the first ATM cell in the packet, 2 represents the second, and so on with M representing the last ATM cell in the packet B. Christensen also teaches for each entry in the table, there is a Partial $CRC_i$, which corresponds to the CRC for the first ATM cell in a packet, partial $CRC_2$ represents the second, and so forth while partial $CRC_M$ represents the CRC for the last ATM cell in the packet. (Col. 4, ll. 42-51).

Claim 4:

**"the cyclic redundancy code is appended to the message and the appended message is transmitted to a receiver"**

Christensen teaches the system CPU adds the trailer and a 32-bit Cyclic Redundant Check (CRC32), as described below. The system then partitions the ATM packet into ATM cells which are forwarded to the ATM Adapter 22 for further processing. (Col. 3, ll. 25-32).

Claims 5 and 21:

**"cyclic redundancy code indicates the existence of an error in the message"**

Christensen teaches the calculated Packet CRC is then compared with the received CRC to determine if an error has occurred in the transmission. (Col. 2, ll. 25-26).

Claims 6 and 37:

**"integrity of the message is verified if the cyclic redundancy code is zero"**

Christensen teaches if Remainder (B/P) is zero, then the frame comprising block B has been received with no apparent errors. (Col. 8, ll. 23-24).

Claim 8:

**"moduloing includes dividing by the generator polynomial"**

Christensen teaches the solution uses the following properties of remainders for modulo-2 (with no carries) division. For any positive integers $A_i$ where i=1, 2, . . . , m, and P, in equations 1-3. (Col. 7, ll. 50-67, col. 8, ll. 1-15).

Claims 10 and 22:

**"the segment-constant for each segment is obtained by moduloing the position of the segment in the message by the generator polynomial"**

Christensen teaches if a packet was 480 bytes long, when only data bytes are taken into account (10 cells, or 3840 bits), the first partial CRC would be multiplied by the Fixed Remainder of $2^{9(48+8)}$, since there are nine cells to the right of it, each 48 times 8 bits long. This multiplication allows us to account for the position of each cell in the packet. Finally, when the multiplication and sum for every partial CRC is done, we are left with a 64 bit result. A two's complement division of this result yields the packet CRC.

Claim 12:

**"the device is a network card"**

Christensen teaches the system includes an ATM Network Interface Card (NIC) and a programmed processor. (Col. 2, ll. 3-4).

**"the modulo unit includes a plurality of modulo units to modulo the each segment of the message by the generator polynomial to obtain the remainder for each segment"**

Christensen teaches the processor calculates the packet CRC for a packet from the partial CRCs associated with ATM cells of the packet, where each partial CRC associated with an ATM cell of a packet is multiplied by an appropriate $R_i$, where $R_i$ represents a fixed remainder. (Col. 2, ll. 9-13).

Claims 13 and 24:

**"a memory for storing a plurality of segment-constants"**

Christensen teaches as part of the CRC calculation, the system software keeps, among other things, two tables within the system memory. One of the tables is a Partial CRC Table ($T_B$) shown in FIG. 6B and the other is the Fixed Remainders Table shown in FIG. 6A. (Col. 4, ll. 37-41).

Claim 14:

**"the segments constants obtain upon receipt of the message"**

Christensen teaches the system includes an ATM Network Interface Card (NIC) and a programmed processor. The processor partitions a packet into ATM cells which are forwarded to the NIC which calculates a CRC for each ATM cell. The ATM cells are transmitted over the link to a destination device and the associated CRCs are returned

for further processing by the processor. The processor calculates the packet CRC for a packet from the partial CRCs associated with ATM cells of the packet. In general, each partial CRC associated with an ATM cell of a packet is multiplied by an appropriate $R_i$, where $R_i$ represents a fixed remainder. (Col. 2, ll. 3-15).

Claims 15 and 25:

**"the modulo unit divides the accumulated-remainder by the generator polynomial to obtain the cyclic redundancy code"**

Christensen teaches the remaining sum is then divided by two's complement to find the CRC for the packet. Christensen also teaches a two's complement division (moduloing) of this result yields the packet CRC. (Col. 4, ll. 5-32).

Claim 18:

**"a degree of a most significant bit of the generator polynomial is greater than a degree of a most significant bit of each segment"**

Christensen teaches the solution uses the following properties of remainders for modulo-2 (with no carries) division. For any positive integers $A_i$ where i=1, 2, . . . , m, and P. Because of the detail and equations involved the Applicant is referred to col. 6, l. 53 through col. 8, l. 15.

Claims 20 and 40:

**"the generator polynomial includes a field extender"**

Christensen teaches in order to transmit over an ATM link, user data structured in accordance with Ethernet and/or Token Ring packet size, each unit of user data is segmented into a plurality of ATM cells. Christensen also teaches prior to segmentation,

a Trailer Data Field (a field extender) and a 32-bit CRC are concatenated to the user data. Christensen further teaches The user data, Trailer and 32-bit CRC form an ATM packet which is segmented in ATM cells and transmitted over the ATM link. Christensen discloses that this method of handling data is fully described in the ATM Adaption Layer-5 (AAL-5) and is well documented in ATM. (Col. 1, ll. 39-47).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 7 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen et al. (US-5951707), hereinafter Christensen, in view of Cox et al. (US-6438724), hereinafter Cox.

Claims 7 and 38:

Christensen does not explicitly teach "the integrity of the message is invalidated if the cyclic redundancy code is non-zero". However, Christensen does teach the calculated Packet CRC is then compared with the received CRC to determine if an error has occurred in the transmission. (Col. 2, ll. 25-26). Cox teaches the CRC syndromes calculated on miscorrected data must be non-zero. (Col. 7, ll. 26-31). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Christensen's CRC generator 30, which calculates packet CRC to include Cox's

CRC syndromes calculation. The artisan would have been motivated to do so because this would enable Christensen's packet CRC to be non-zero in the case of an error.

9. Claims 9, 16 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen et al. (US-5951707), hereinafter Christensen, in view of Feldmeier, (Fast Software Implementation of Error Detection Codes), hereinafter Feldmeier.

Claims 9, 16 and 26:

Christensen does not explicitly teach "moduloing includes multiplying by a reciprocal-approximator for the generator polynomial". Feldmeier teaches in rewriting the division of equation (4) as multiplication by a reciprocal. (Pg. 644, col. 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Christensen's CRC generator 30 to perform reciprocal multiplication in the process of calculating packet CRCs. The artisan would have been motivated to do so because it would enable Christensen to drop the lower order word after the multiplication and as a result CRC only needs to be calculated on the higher order facilitating a faster implementation.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Li et al. (US-5619516)

Li teaches generating a plurality of CRC remainder coefficients, CRC generating polynomials and modulo-two operations. (Claims 1-6, 8, 10, 11-15, 17-25, 35-37, 39 and 40).

b. Kim et al. (US-6820232)

Kim teaches a device for detecting in a receiver whether any transmission errors have occurred in the received CRC code, in a case that a transmitter transmits the CRC code created by sequencing the parity bits, which are generated using the generator polynomial, in the reverse order and appending them to the message bits. (Claims 9, 16, 26)

c. Roginsky et al. (Efficient computation of packet CRC from partial CRCs with application to the Cells-In-Frames protocol)

Roginsky is the IEEE document of the Christensen et al. (US-5951707) patent and, therefore teaches all limitations presented by Christensen. (Claims 1-6, 8, 10, 11-15, 17-25, 35-37, 39 and 40).

d. Glaise et al. (Fast CRC Calculation)

Glaise teaches checking for errors in the CRC code as to whether it is a zero or not. Glaise also teaches padding or field extention. (Claims 5-7, 21, 21, 37, 38 and 40).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John J. Tabone, Jr. whose telephone number is (571) 272-3827. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

John J. Tabone, Jr.
Examiner
Art Unit 2133

Primary Examiner